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J. C. STRICKLAND
Director of Sales, Eastern Division, American National Growers Corporation

VOL. 37 — NO. 11 NOVEMBER, 1956 BARTOW, FLORIDA

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R. M. Pratt

Citrus Insect Control For November 1956

R. B. Johnson

R. B. JOHNSON*
R. M. PRATT
W. L. THOMPSON
Florida Citrus Experiment Station, Lake Alfred

W. L. Thompson

The average red scale population increased in October, and is expected to reach a peak after the middle of November. The level will be high enough to cause damage in many groves. Purple scale infestations are incraesing slowly from a low level. The increasing trend will continue through November. Even though the average infestation will be low, fruit should be watched carefully for scale infestations around the stem. Even a light infestation there may cause fruit to drop. Purple and chaff scale on early-harvested fruit will cause green spots which cannot be removed in the degreening room.

Purple mite infestations are generally low, but there have been heavy infestations in some groves, especially in the Ridge District. In the fall and winter, even moderate infestations may be followed by severe mesophyll collapse and firing if dry, windy weather occurs.

Rust mite infestations increased sharply in October, and the level will remain high through December. Infestations on fruit are still considerably heavier than those on leaves.

Plant bugs are appearing in some groves, especially where citron melons are growing.

SPRAY PROGRAM

The control program for November in most groves will be built around measures aimed at killing mites, but scale insects should not be overlooked. Red scale in particular should be expected to give trouble. Growers should remember that it is important to prevent a late season build-up of red scale because small numbers can quickly become sufficiently numerous to cause leaf drop that may result in dead wood and a consequent fruit drop.

Red scale is more difficult to detect in small numbers than purple scale because it is seldom evenly distributed and is usually confined to parts of trees or irregular sections of groves. This means that more trees must be examined to obtain an accurate estimate of a red scale infestation than with purple scale.

It is just as important to control fall and winter purple scale infestations as it is to control red scale. Every year purple scale causes a certain amount of fruit drop. This, if not stopped, can result in a serious reduction in yield. Although other factors may also be involved, fruit drop in the fall and winter frequently results from purple scale feeding around the stem end of the fruit. This is not the only damage done by purple scale during this period. Both purple and chaff scales cause green spots on the fruit and these spots are not degreened in the coloring room. So, check for purple and chaff scales on the fruit and apply control measures to prevent fruit drop and grade-lowering green spots.

Mite control in November will have to be aimed at rust mite, purple mite and the more recent arrival, Texas citrus mite. The latter mite now appears to be a problem in most areas. It is so new, however, that many growers have not become acquainted with it. An excellent description and illustrations of this mite were given in Volume 36 of the **Florida Entomologist** by M. H. Muma, H. Holtsberg, and R. M. Pratt. But, because this publication is not readily available to growers, a description is given here. Adult female Texas citrus mites are broad and flattened. The color varies from tan to brownish-green with dark brown to greenish spots and bars near the edges. The legs are pale with the segments next to the body tan and brown. If in doubt, look for the eggs laid along the mid-rib and edges of the leaf. Eggs are flat with a fine rim. In color, they vary from light yellow to tan, green and reddish-brown. Texas citrus mite causes the same damage as purple mite including mesophyll collapse.

Both purple mite and Texas citrus mite should be controlled early if serious damage is to be prevented later. This statement also applies to rust mite.

Plant bugs have been reported in some groves, and more can be expected in November. These insects feed by sucking on tangerines and early and mid-season oranges. Feeding results in fruit drop and small irregular brown spots in the peel. Where plant bug injury is suspected, cutting the fruit will show characteristic brown corky areas in the albedo and dry juice sacks immediately underneath the external brown areas. Plant bugs are most common in groves where large numbers of citron melons have been chop-

SCALE AND MITE ACTIVITY BY DISTRICTS*

District	Purple Scale	Red Scale	Purple Mite	Rust Mite on leaves	Rust Mite on fruit
West Coast	3.43	1.39	1.54	2.38	2.61
Indian River	3.72	3.49	.94	2.56	2.71
Upper East Coast	1.96	1.50	1.13	3.00	2.40
Gainesville	2.50	4.00	.34	.00	.50
Orlando	2.88	3.28	.08	.84	1.26
Brooksville	3.23	1.33	1.60	2.58	2.42
Ridge	4.08	4.36	1.89	3.08	3.14
Bartow	2.69	3.27	1.50	3.67	4.00
State Average	3.25	3.33	1.16	2.17	2.26
Last Year	4.05	3.84	1.03	2.01	2.28

* Third week in October. Activity is computed from populations, amount of hatching of scales, and number of groves with increasing or decreasing infestations. Activity is considered high if above 4.0 for purple scale, 3.0 for red scale, and 1.5 for mites.

* Written October 26, 1956. Reports of surveys by Harold Holtsberg, Cocoa; J. W. Davis, Tavares; K. G. Townsend, Tampa; T. B. Hallam, Avon Park; and L. M. Sutton, Lake Alfred.

ped up because they feed to maturity on citron seeds and then move to the ripening citrus.

Scale Control: The most satisfactory scalicide for fall and winter use is parathion, because it is more effective against red scale than oil emulsion and does not reduce soluble solids or affect degreening. Oil emulsion, on the other hand, not only reduces soluble solids and prevents or increases the difficulty of degreening, but also makes trees more susceptible to cold injury. Parathion should be used at the dosage of 1 to 1.7 pounds of 15 percent wettable powder per 100 gallons of spray. Parathion may be used with up to 1 gallon of lime-sulfur per 100 gallons of spray and is compatible with all recommended miticides. Although parathion is less effective during cold and/or windy weather, its effectiveness is not reduced by rainfall occurring four or more hours after spraying where a thorough application has been made.

Malathion is an effective scalicide which may be used in place of parathion or oil emulsion. For effective results, however, it must be used at the dosage of 3 to 5 pounds of 25 per cent wettable powder per 100 gallons. Malathion's chief asset as far as citrus is concerned, is its low toxicity. This means that it can be used safely around dwellings, next to pastures, and other places where the more dangerous parathion should not be used.

Purple Mite Control: Superior purple mite control is more likely with thorough applications applied to low mite populations. Conversely, failures are likely to result if too little miticide is used or if the miticide is applied after mite populations reach high levels. This applies to all of the recommended miticides although it seems to be somewhat less true with Systox.

To properly time miticide sprays, it is suggested that groves be checked for mites as often as possible and sprays applied as soon as about 20 percent of the leaves are infested. To determine the population level, it is more important to check different areas in a grove than it is to inspect large numbers of leaves. Inspections should usually be made in at least four areas, preferably more, and at least 25 well-distributed leaves checked in each area. When mites are found on one out of five leaves or 20 per cent, it is time to spray. Tree tops should be checked for mites if they are not found on the lower portions of the tree.

DN Dry Mix, the least expensive miticide, may now be used at 2/3 pound per 100 gallons on all but fruit intended for the fresh fruit market. It is suggested that the use of DN be avoided on fresh fruit because it may cause a blemish wherever the peel is weak. DN Dry Mix can be used with parathion and sulfur, but cannot be mixed with lime-sulfur or in any alkaline solution.

Aramite 45W at 2/3 pound per 100 gallons or aramite 15W at 2 pounds may be substituted for DN. Aramite is safe to use at any time, but cannot be used in alkaline solutions.

Ovotran is an effective miticide with good residual properties, but it does not give a fast kill. Therefore, for quick results, it must be supplemented with parathion or TEPP. For this reason, it is the logical miticide to use where parathion is to be used as a scalicide. Do not use ovotran in the same grove more than once a year because its effectiveness is reduced through continuous use. Ovotran should be used at 1 pound per 100 gallons plus 1/2 pound of 15 percent parathion or 1/2 pint of 40 percent TEPP.

Systox, a new arrival on the miticide scene, is very effective, but hazardous to handle. The precautions used in handling parathion must also be used with Systox. This miticide is a systemic poison, which means that it is absorbed by the tree and, for a short time, makes the plant juices poisonous to mites. In terms of spraying, this means that although all foliage must be sprayed for best results, it is not necessary to wet the undersides of the leaves. Use Systox at not less than 1/2 pint per 100 gallons and do not combine it with any alkaline solution such as lime-sulfur. Systox does not control rust mites.

Texas Citrus Mite Control: Although several miticides are now being tested against Texas citrus mite, no data is available as yet. However, reports from growers indicate that this mite is less difficult to control than purple mite and that good results can be expected from any of the miticides recommended for purple mite.

Rust Mite Control: The most effective spray for rust mite is 1 gallon of lime-sulfur plus 5 pounds of wettable sulfur per 100 gallons of water. Lime-sulfur may be used with parathion and/or ovotran, but should not be used with aramite, DN Dry Mix or Systox. Where any of the latter miticides are needed, use 8 to 10 pounds of wettable sulfur. Do not use lime-sulfur on tangerines or early varieties of oranges.

Plant Bug Control: Plant bugs may be controlled by dusting trees with 10 percent toxaphene dust at 50 to 60 pounds per acre or spraying with 25 percent toxaphene wettable powder at about 25 pounds per acre. Parathion at 3 pounds of 15 percent material per acre is also effective. Air blast sprayers are preferred for applying insicticides for plant bug control.

For more detailed information refer to the 1956 "Better Fruit Program" or consult the Citrus Experiment Station at Lake Alfred or Fort Pierce.

USDA AMENDS GRADE STANDARDS FOR FROZEN CONCENTRATE FOR LIMEADE

The U. S. Department of Agriculture has amended the United States Grade Standards for Frozen Concentrate for Limeade to permit the addition of a suitable green food coloring material to standardize the color of the product.

The amendment also defines color requirements for the artificially colored product.

The amendment becomes effective on November 2, 1956.

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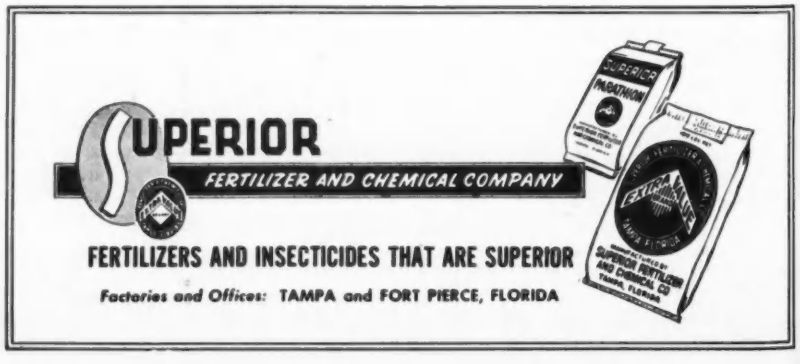

The Citrus Industry
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Citrus Handling And Processing Cost Studies

BY UNIVERSITY OF FLORIDA, AGRICULTURAL ECONOMICS DEPARTMENT

A. H. SPURLOCK, ECONOMIST, IN CHARGE

1. Costs of Picking and Hauling to Packing House or Cannery.

Records of costs from a large sample of firms which perform picking and hauling services are obtained each year in September covering the crop for the season just completed. A report summarizing these costs is issued in January of each year, 4 months after the records are obtained. The latest report to be issued on these costs is:

> "Agricultural Economics Department Mimeo Report No. 56-6, Costs of Picking and Hauling Florida Citrus Fruits, 1954-55 Season" dated January 1956 by A. H. Spurlock, Agricultural Economist.

The average cost of picking and hauling fruit during the 1954-55 season for the sample of 37 firms studied was 38.31 cents per box for oranges, 30.29 cents per box for grapefruit, and 74.10 cents per box for tangerines.

2. Costs of Packing and Selling Fresh Citrus Fruit.

Accounting records of firms handling more than a third of the state's citrus, packed for sale in fresh form, are studied each year. The records are obtained in September for the previous season's crop. A report summarizing the packing and selling costs for oranges, grapefruit and tangerines in each major type of container is issued, 4months later, in January. The latest report to be issued on these costs is:

> "Agricultural Economics Department Mimeo Report No. 56-5, Cost of Packing and Selling Florida Fresh Citrus Fruits, 1954-55 Season", dated January 1956 by A. H. Spurlock and Eric Thor.

The average cost of packing and selling Florida fresh citrus during the 1954-55 season for the sample ot 43 packing houses studied was 88.63 cents per 1 3/5 bushel wirebound box of oranges, 79.84 cents per 1 3/5 bushel wirebound box of grapefruit, and $1.4266 per 4/5 bushel wirebound box of tangerines. For oranges and grapefruit, the packing and selling cost per 1 3/5 bushel wirebound box increased about 12 cents between the 1948-49 season and the 1952-53 season. However, it has now decreased about 7 cents per box since 1952-53. For tangerines, the packing and selling cost has increased about 22 cents per 4/5 bushel wirebound since the 1948-49 season.

3. Costs of Processing, Warehousing and Selling Citrus Products.

Firms which pack more than half of the state's processed citrus products furnish their cost records to the University each year in September covering their operations for the season just completed. A report summarizing these costs is issued in June of the following year, about 9 months later. The latest report to be issued in this series is:

> "Agricultural Economics Department Mimeo Report No. 56-11, Cost of Processing, Warehousing and Selling Florida Citrus Products, 1954-55 Season," dated June 1956 by A. H. Spurlock, Univ. of Florida, and I. W. Rust, Farm-

(Continued on page 19)

Xyloporosis In Relation To Certified Citrus Budwood 1/

J. F. L. CHILDS
HORTICULTURAL CROPS
RESEARCH BRANCH
AGRICULTURAL RESEARCH
SERVICE, U.S.D.A.,
AT CITRUS INSTITUTE,
CAMP McQUARRIE

Introduction

When 60 per cent or more of the citrus trees in the Certified Budwood Program were found to be infected with xyloporosis(2), many nurserymen and growers were shocked, and some were discouraged. They asked: What does this mean to the Budwood Program? Will the program collapse? When, if ever, can xyloporosis-free budwood be obtained? And what about psorosis-free and tristeza-free budwood in the meantime? The purpose of this paper is to discuss certain aspects of xyloporosis and to show how they relate to the Budwood Program and the availability of budwood.

Xyloporosis is a disease that was described first in Palestine in 1934(7) on sweet lime rootstocks. The cause was not known at that time, but recent experiments indicate that a virus is the cause(3). In 1945 a disease with the same symptoms(1) was found on Orlando tangelo trees in Florida. It was named cachexia because its relation to xyloporosis had not been proved, even though it had been suspected. In 1951 xyloporosis on sweet lime rootstocks(4) was found in Florida by E. P. DuCharme. Inoculations from these xyloporosis-infected trees were made to Orlando tangelo seedlings, and the reverse inoculation with cachexia-infected material were made to Palestine sweet lime seedlings(3). The results indicated that the two diseases are caused by the same virus, or by strains of the same. The name xyloporosis was retained because it has priority.

Severity of Xyloporosis Symptoms On Various Species

Species and varieties of citrus are affected by xyloporosis in different degrees. There is some variation in symptom expression even on trees of the same age within a single variety, and there are also symptom differences in trees of different ages. Symptoms range from very severe in certain tangelo varieties to no detectable ones in sweet orange, sour orange, and grapefruit varieties. Between these two extremes there are many intermediate degrees. For example, symptoms on sweet lime are not so severe as those on Orlando and certain other tangelos, but they are more severe than those on Rough lemon. Thus, symptoms may be very poorly expressed or take a long time to appear in some varieties, and in others they cannot be detected by observation. Sweet orange varieties and grapefruit varieties, which produce the bulk of the citrus crop, fall in the latter class; consequently, it is necessary to test them by budding on very susceptible citrus varieties such as Orlando tangelo. This is just what is being done in the Certified Budwood Program.

Xyloporosis Infection In Florida Citrus

From our earlier work it was known that xyloporosis was widespread in several old-line varieties of sweet orange and grapefruit, but the results from the Budwood Program show that xyloporosis is more widespread than suspected(5). In 10 varieties of sweet orange, xyloporosis infection ranged from 100 per cent in certain ones down to 29 per cent in the least infected one. Several varieties were represented in the tests by only a few trees. Average infection for those might be quite different if more trees were tested. Final examinations have not been made, but at last examination the average xyloporosis infection in all 10 varieties was 68 per cent. The average infection in 6 varieties of grapefruit in the program was 92 per cent. At the present time nine hundred twenty-nine trees have been accepted for test in the program, and 676 of these have had at least one inspection in the xyloporosis test. Of that number, 456 (67 per cent) have given at least one positive test for xypolorosis.

Strange as it may seem, the Orlando tangelo trees in the program are among the few varieties free of xyloporosis. That has happened because Orlando trees are very susceptible, and consequently infection can be determined by direct examination of the candidate tree. Bud tests are made as a precaution, however.

Spread of Xyloporosis

The high level of xyloporosis infection among the commercial varieties of citrus has probably come about in several ways. Perhaps the most important and most common way is perpetuation by using budwood from infected trees. Buds from infected trees always develop into infected trees. No exceptions are known. Healthy buds grafted on infected trees or on infected stumps or seedlings, will become infected and develop into infected trees. Furthermore an infected bud can infect a rootstock, even though the bud dies subsequently, and any tree grown on that infected rootstock will become infected. Consequently, it is important that xyloporosis-free buds be pro-

1/ The movement that led to the Budwood Program was launched at the Camp McQuarrie Citrus Institute on August 30, 1951. Many people had a hand in the launching; but particular mention should be made of Bob Norris, Fred Lawrence, and Al Whitmore, because they took the first steps. After many meetings, much more work, and after matters of finance and other things were settled, a budwood certification was finally on the books. It makes no difference how high the aims of such an enterprise may be, or how carefully planned, or how adequately financed. What determines the success of this, or any other program, is the man who runs it. The Florida program has come a long, long way. It is further along than most growers realize and has become the pattern for programs in many other areas. That this is so is largely due to the efforts of Gerald Norman, who has made that paper program what it is today, a dominant factor in the struggle for higher production, better quality, and lower costs in citrus production.

pagated on xyloporosis-free rootstocks.

The possibility that the xyloporosis virus may be transmitted through the seed brings another factor into the picture(3). For all practical purposes seedlings are free of psorosis virus, and freedom from other citrus viruses has been assumed. However, within the last year we have obtained evidence that xyloporosis can be transmitted through the seed of sweet lime and possibly through Rough lemon seed. On the other hand, Orlando tangelo trees reared from seed of xyloporosis-infected parents have shown no xyloporosis symtpoms at 4 years of growth. Thus, it seems that seed transmissions may occur in certain species and varieties and not in others. At present we are testing over 3,000 seedlings of many varieties for seed transmission of xyloporosis.

In our xyloporosis experiments we have seen no evidence of insect transmission, but investigation of this phase of transmission is in progress in cooperation with entomologists of the U. S. Department of Agriculture.

Economic Importance of Xyloporosis

In very susceptible varieties, like the Orlando and certain other tangelos and in sweet lime, xyloporosis is a limiting factor. In most cases infected trees never come into full production or are commercially worthless. Sweet lime is not grown for fruit production in Florida, but it is an excellent stock, superior to Rough lemon in certain respects, and we would use it if we could.

In symptomless species such as sweet orange and grapefruit, the relation between xyloporosis infection and monetary returns is not known. It is suspected that xyloporosis reduces fruit yields to some extent, but how much is still a question. There seem to be no xyloporosis-free groves of budded orange or grapefruit trees for comparison. We do not know where species and varieties of intermediate susceptibility stand economically, but it seems safe to assume that losses would be intermediate also.

Xyloporosis is a factor in the rootstock problem from two standpoints: (1) use of susceptible species or varieties as rootstock can result in serious losses; (2) the use of otherwise desirable rootstocks is lost. The sweet lime is an example. For all practical purposes, we are barred from using this excellent stock because it is very susceptible to xyloporosis and because all the old-line varieties of citrus are more or less infected.

Effect of Xyloporosis On The Budwood Program

As Gerald Norman, who is responsible for the program, has said, Florida citrus trees are no worse now than they were before the extent of xyloporosis infection became known, and they are no worse than citrus in other areas. The difference is that we have done enough work to begin to appreciate the wide distribution and the seriousness of xyloporosis infection in our principal citrus varieties. The Budwood Program deserves the credit for developing much of this information. The other half of the story is that the program is also doing something about the problem of citrus diseases by testing and selecting strains of the principal commercial varieties that are as completely virus free as possible. In that respect, Florida's Budwood Certification Program is one of the most ambitious and comprehensive. I think it is safe to say that no other program is as comprehensive as the Florida program. It is a pattern for other programs.

Granted that disease-free trees have many advantages over old-line trees, how long will it be before certified trees will be available? Trees of limited certification, that is, trees certified as free of psorosis and tristeza only, are available now from certain nurseries, and deliveries are being made. However, the trees must be contracted for in advance. None is available for over-the-counter sales. Even though trees may be infected with xyloporosis and exocortis, they are much better than ordinary trees because they can be expected to have longer productive life, and better cold tolerance and to need fewer replacements in the future.

People connected with the Budwood Program feel sure that trees free of all four viruses — psorosis, tristeza, xyloporosis, and exocortis — will be even better, still more productive, and longer lived. One of the reasons for this improvement is that they can be used on better rootstocks. Trees in this deluxe class are not commercially available at present because tests for xyloporosis and exocortis take two or three times as long to complete as psorosis and tristeza tests. Furthermore, parent trees free of xyloporosis and exocortis are more scarce to start with. Consequently, it will take several years to build up an adequate supply of nursery trees. However, fully certified trees are on the way. It is just a matter of time until such trees will be available.

In conclusion it should be pointed out that citrus diseases take a tremendous toll from the citrus industry every year, a far larger toll than most people realize. As near as can be calculated from the State Plant Board tree count(8) in 6 counties (Polk, Pinellas, Lee, Lake, Highlands, and Dade), 1 tree space out of 12 is out of production because of disease. This means that a potential production of over 11 million boxes of fruit was lost in 1954-55. The loss from moderately decreased production in the early stages of disease is impossible to calculate. Virus diseases are responsible for a large part of these losses, and the use of certified trees that are becoming available through the efforts of the Budwood Program is the only effective method of controlling them. Within the next 10 years the Certified Citrus Budwood Program will be recognized as a major factor in the forward progress of the Florida citrus industry.

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Preliminary report for Dade County, December 1, 1955.

Preliminary report for Lake County, March 1, 1956.

Elderly patients who have a devoted family seldom seek entrance into home for the aged, especially when custodial care is the only need, according to a contributor to the University of Florida Press book, "Aging and Retirement."

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Citrus Commission To Hold Trade Luncheon

More than 2000 retailers, whol salers, brokers, distributors, a others interested in the sale of fre fruit and processed Florida citr fruits and products have been invit to attend the sixth annual series trade luncheons sponsored by t Florida Citrus Commission in ma market areas of the United Stat and Canada.

According to FCC General Manage Robert C. Evans, the five-week p gram got under way in Atlanta, G on Oct. 29th., and will conclude New Orleans on Nov. 27th.

Outlining the plans for this yea trade luncheon series, Frank D. A Merchandising Director for the Citr Commission, said the program t year is carefully designed to ena the Commission to make a perso contact with practically all importa trade factors in the top 22 mar areas where Florida citrus is sold fresh, canned, or frozen form.

Paul S. Patterson, FCC Ad Dir tor, pointed out that the many tra factors who attend the meetings w hear brief presentations explaini the Commission's $4,000,000 advert ing merchandising program for t 1956-57 season, and how this expen ture by the FCC will help to mo Florida citrus products.

Both Patterson and Arn, along wi Ralph Henry, FCC Director of Sal Service, and Harry Warren, Bent and Bowles Advertising Agency repr sentative, will join in conducting t meetings.

Members of the 65-man FCC fie merchandising force will act as hos to the luncheon meetings in each their respective areas, and will pr view samples of Florida citrus di play material which will be availab to the trade during the season.

The FCC sponsors the yearly tra luncheon tour in order to allow reta and wholesale trade factors an oppo tunity to become informed of season advertising and merchandising pla of the Commission.

"In addition to the other aspec of the luncheon meetings," Patters said, "the luncheons give our reta ers and wholesalers an opportuni to plan their own promotions to c ordinate with the Commission's natio wide advertising and merchandisi program. They may also tie-in the own local food advertising to bre with citrus ads during the FC

(Continued on page 16)

Mexican Orange Growers Casting Covetous Eyes On U. S. Markets

Mexican orange growers, who can produce their crops with cheap labor at a much lower cost than Florida, are eyeing the domestic U. S. market as a potential outlet for an increased quantity of their fruit.

This is the conviction of Martin E. Hearn, export coordinator for Florida Citrus Mutual, expressed in a report to Mutual's general manager, Robt. W. Rutledge. Hearn has just returned from Mexico where he spent 10 days in the principal citrus-producing part of the country, making a personal survey of the orange industry there as a current and potential competitor of Florida in the U. S., Canada and other export mrkets.

"We must recognize that Mexico grows a fine looking and excellent eating orange, which carries well," Hearn pointed out.

Statistics are scarce in Mexico, Hearn said, but growers he talked with said they spent 24 cents to 32 cents to grow a box (1 2/5 bushels) of oranges, depending on the age of the tree.

"The Mexican growers are prospering," the Mutual export official said, "and are enjoying a definite seller's market. Land is extremely fertile and requires very little fertilizer, and the fruit needs hardly any spraying. The lack of wind enables the production of scar-free fruit. Grove labor can be hired for 50 to 75 cents a day and a day there means from sun-up to sun-down."

An import duty of one cent a pound or about 70 cents a box on all oranges shipped into the U. S. helps overcome some of the competitive advantage enjoyed by Mexican because of these extremely low labor costs, Hearn said.

The two big producing areas of Nuevo Leon and Tamaulipas, where the oranges which compete with Florida fruit are grown, have a total of eight million trees — 46 percent are early variety oranges including navels, 46 percent Valencia type oranges, five percent tangerines, and three percent grapefruit.

Mexico's early orange is ready for market early in October, somewhat before Florida oranges are mature. The Mexican Valencias ripen about the same time as in Florida.

There re about two million citrus

There are about two million citrus in the Vera Cruz and Tampico sections, but these areas get so much rain the oranges grown there do not carry well enough for export and all are consumed locally.

MARTIN E. HEARN
EXPORT COORDINATOR
FOR FLORIDA CITRUS MUTUAL

Hearn said he found the Mexican industry looking at the U. S. market with more and more eagerness, after being able to make small penetrations through merchandising arrangements with some U. S. firms. So far this season, Mexico has shipped approximately 250,000 half-box cartons of oranges into the U. S. markets, he estimated.

Mexico at the moment also is banned from the Canadian market, because of that country's ban on color-added oranges, Hearn said. Practically all Mexican oranges are given the color-added treatment until late in November, when they will attain sufficient natural color for shipment without being colored.

"They are hoping," Hearn said, "to step in and take over much of Florida's Canadian orange business, if the color-add ban is not rescinded. Mexico has been shipping close to 100,000 boxes of oranges to Canada each year."

Hearn said Mexican shippers "are anxious to break into the European market in a big way, too, because the restrictions on fruit going there are much less stringent than on fruit going to the U. S. Because of the Mexican fruit fly, all oranges shipped into the U. S. must be fumigated, using the same process as in Florida for the medfly.

"Mexican oranges can be transported through the U. S., however, when destined for some other country, or to some port such as Brownsville, Texas, for further movement aboard ship without fumigation, providing sealed railroad cars or motor trucks are used.

"U. S. Department of Agriculture officials are concerned about the situation, too," Hearn said, "because of the possibility that in transferring the boxed oranges from the railroad cars or trucks to a ship, stevedores may pilfer some of the fruit and give the Mexican fly a chance to get loose in this country."

The Mexican fruit fly's habits are much like those of the Mediterranean fruit fly, he said. A joint but limited eradiction program is being conducted by the U. S. and Mexican governments.

MEDFLY SPRAY HARMLESS TO CITRUS TREE SNAILS

Many citrus growers who do not regularly spray their groves believe that the activity of tree snails in cleaning leaves and fruit is beneficial. Those growers who maintain and encourage tree snails in their groves need have little fear that the bait sprays being applied in the Medfly eradication program will destroy their snails.

Dr. W. A. Simanton, entomologist at the Citrus Experiment Station, Lake Alfred, stated that numbers of snails have been caged with leaves immediately after the leaves were sprayed with two to four times the usual dosage. None of the snails were killed even though confined with the leaves for as long as two weeks.

In grove experiments, the little mollusks move normally over the sprayed branches and survived repeated spraying. Medfly sprays are applied to obtain a spatter pattern that covers only a small part of the tree surface. Although the snails sometimes glide over the spray residues, they do not remove the bait from the leaves.

General Crop Report As Of October 1, 1956

CITRUS

Growing conditions in Florida during September were generally favorable for citrus. Rainfall for the citrus area was about normal for the month. Lake levels are still somewhat low but ground moitsure is about normal, promoting good growth of fruit and trees. There is a good set on oranges and tangerines but sizes are small for this time of year. Grapefruit set is lighter and average size of fruit is smaller than usual. Maturity appears to be about two weeks later than last year. Only a very small quantity of grapefruit and a few early oranges had been harvested by the first of October. The current light volume is expected to increase by the middle of the month.

The production of all citrus in Florida for 1956-57 harvest is estimated at 135,580,000 boxes, which includes 95 million boxes of oranges, 35 million boxes of grapefruit, 5.2 million boxes of tangerines, and 380,000 boxes of limes. This compares with the 1955-56 crop of 134,400,000 boxes, which included 91 million boxes of oranges, 38.3 million boxes of grapefruit, 4.7 million boxes of tangerines and 400,000 boxes of limes.

UNITED STATES

Total crop outturn for 1956 on the basis of October 1 estimates will be about one percent larger than expected a month ago. Progress, maturity, and harvest of late crops have generally been good despite some sectional reverses. Crops which have gained, significantly to slightly, in estimated production since September 1, include soybeans, flaxseed, fall potatoes, dry beans, peanuts, cotton, hay, corn, tobacco, sorghum grain, spring wheat and sugar beets. Estimates for fruit crops as a group have also increased slightly, as have those for fall vegetable crops for fresh market and for processing. Slight decreases are evident for rice, sugarcane, and hops.

CITRUS

The 1956-57 early and midseason orange crop is forecast at nearly 70.9 million boxes — 4 percent more than 1955-56. Somewhat larger crops in Florida, Texas and Arizona more than offset smaller production prospects in California and Louisiana. Florida's production of these varieties at 54 million, including 3 million Temple oranges is up 2.5 million from 1955-56. California's crop of Navel and miscellaneous oranges, indicated at 14.5 million boxes, is 670,000 boxes smaller than last year. Production in Texas, Arizona and Louisiana is forecast at 2.4 million boxes compared with 1.8 million in 1955-56.

October 1 conditions in Florida pointed to a Valencia crop of 4 million boxes for 1956-57. Last year Florida produced 39.5 million boxes of Valencia oranges. Arizona and Texas anticipate 1.35 million boxes—slightly more than produced in 1955-56. California's first forecast of Valencias will be made in December. Florida Tangerines are forecast at 5.2 million boxes, half a million boxes above 1955-56 and 12 percent above average.

The **Grapefruit Crop** (excluding the California summer crop) is expected to be 3 percent smaller than the 43.7 million boxes produced in 1955-56. The 42.3 million boxes forecast for the coming season include 35 million for Florida, 3.5 million for Texas and 800,000 for California Desert Valley. Florida expects a slightly larger crop of seedless grapefruit, mainly in the pink varieties, but the production of seeded varieties is 21 percent less than last year. The initial forecast of California summer grapefruit will be released December 11. The **Florida Lime** crop is estimated at 380,000 boxes, 5 percent below last season. By the 1st of October nearly 250,000 boxes had been harvested. During the past few weeks processors have been using a large percentage of this harvest.

In Texas scattered showers and the availability of some irrigation water improved the general conditions of citrus trees during September. While fruit has not made the desired growth, there is still a good set holding. Harvesting of a few early oranges has started. Grapefruit marketing is expected to begin in late October.

California citrus crops made satisfactory progress in September. Navels in the Sacramento Valley have a light set of fruit but a good crop is expected in central California. Production in Southern California is expected to be somewhat smaller than last year.

During the Civil War, salt making, which centered around St. Andrews Bay in Florida, became so important that men employed in it were exempted from military service, says Rembert W. Patrick, in the University of Florida Press book, "Florida Under Five Flags."

CITRUS ESTIMATE — OCTOBER 1, 1956

(Released by U. S. Department of Agriculture, October 10, 1956)

Comparison of October 1, 1956, Estimate With Actual Production for Prior Years

	(In Millions of Boxes) ACTUAL PRODUCTION				Estimated For 1956-57
	1952-53	1953-54	1954-55	1955-56	(At Oct. 1)
ORANGES					
U. S., All	120,180	125,870	130,345	132,265	/1
Florida, All	72,200	91,300	88,400	91,000	95,000
Early and Midseason	40,600	48,000	49,500	48,700	51,000
Valencias	29,900	41,100	36,400	39,500	41,000
Temples	1,700	2,200	2,500	2,800	3,000
California, All	46,030	32,400	39,140	38,770	/1
Early and Midseason	16,630	14,460	15,340	15,170	14,500
Valencias	29,400	17,940	23,800	23,600	/1
Texas, All	1,000	900	1,500	1,150	23.00
Arizona, All	900	1,170	1,130	1,150	1,320
Louisiana, All	50	100	175	195	115
GRAPEFRUIT					
U. S., All	38,360	48,370	42,170	45,280	/1
Florida, All	32,500	42,000	34,800	38,300	35,000
Seedless	17,100	21,900	20,500	20,600	21 000
Other	15,400	20,100	14,300	17,700	14,000
California, All	2,460	2,500	2,400	2,410	800/2
Texas, All	400	1,200	2,500	2,200	3,500
Arizona, All	3,000	2,670	2,470	2,370	3,500
TANGERINES					
Florida	4,900	5,000	5,100	4,700	5,200
Total U. S. Citrus /4	163,440	179,240	177,615	182,245	/3
Total Florida Citrus /4	109,600	138,300	128,300	134,300	135,200

/1 Estimate not available until December 10. /2 Desert Valley Only.
/3 Total on December 10. /4 Excluding Lemons and Limes.

Revised Rules For Inspection Proposed

USDA Proposes Revision of Rules and Regulations Governing Inspection and Certification of Fresh Fruits, Vegetables and Related Products

Revised Rules and Regulations governing the inspection and certification of fresh fruits, vegetables, and related products were proposed recently by the U. S. Department of Agriculture. This revision includes all current amendments and also incorporates several changes in and additions to the regulations.

Instructions are included for handling cases of fraud and misrepresentation which are reported to the director of the Fruit and Vegetable Division of USDA's Agricultural Marketing Service.

A provision is made for using on containers approved identification marks which will indicate the U. S. grade of the product and show that it has been inspected.

The additional charge for inspections made at terminal markets on Saturdays, Sundays and holidays and all other periods which are outside the inspectors' regular work week, is changed from $1.75 to $2.00 per hour. This will bring the charge in line with that of Federal inspectors working under a Federally operated shipping point service. The shipping point fees contained in these regulations apply only in the absence of cooperative agreements under which such fees are established for the State concerned.

A number of changes of an administrative nature are made to make clearer the wording of the present regulations.

The proposed revised rules and regulations were published in the October 4, 1956 issue of the Federal Register; and interested parties submit any comments or suggestions regarding the proposal to E. E. Conklin, Chief, Fresh Products Standardization and Inspection Branch, Fruit and Vegetable Division, Agricultural Marketing Service, U. S. Department of Agriculture, Washington 25, D. C., by Nov. 5, 1956.

In the Elizabethan Age in England it was one of the customs of the song writers to make songs out of the confessions of criminals, says the author of the University of Florida Press book, "Shakespeare's Use of Music."

Art Karst, Indian River Grove Management Specialist, Vero Beach, checks development of citrus crop coming along beautifully with help of d/p Dolomite

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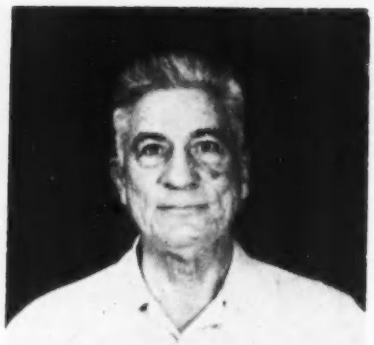
Control Of Purple Scales, Whiteflies And Citrus Red Mites

On Grapefruit Trees With Phosphorus Insecticides

. . . BY . . .



HERBERT SPENCER
AND ALLEN G. SELHIME
ENTOMOLOGY RESEARCH
BRANCH(1)

Experiments between 1949 and 1953 demonstrated that heavy infestations of purple scale (Lepidosaphes beckii (Newm.)) on grapefruit trees could be kept under control with two or three sprayings of parathion per year (1). This material did not control the citrus red mite (Metatetranychus citri (McG.)), however, and in some cases the number of mites tended to increase (2). Heavy and damaging infestations of scale insects and citrus red mites often develop on grapefruit if scalicides and miticides are omitted from combination sprays. The problem was solved by adding a summer miticide, usually ovex, to the combination spray containing parathion, but it increased the cost of spraying considerably.

In 1953 when several organic phosphorus insecticides became available, it was thought that one or another of them might control both scales and mites, as well as the whiteflies (Dialeurodes citri (Ashm.) and citrifolii (Morg.), and prove to be an acceptable substitute in the spray program for these two rather expensive materials. In some experiments early in the year on the control of citrus red mites on Temple orange trees, demeton at 1 pint of 21.2 percent emulsifiable concentrate and malathion at 2 1/2 pounds of 25 percent wettable powder per 100 gallons had appeared promising (3). These materials were therefore included in new experiments.

Procedure

In a grove of bearing Ruby grapefruit trees experiments were arranged in ten randomized blocks of six trees each, each tree in a block for a different spray treatment. Parathion plus ovex was used largely for comparison with demeton and malathion. In the spring, March or April, the materials were added to different tanks of the combination spray, which contained basic copper sulfate for control of fungus diseases, zinc and manganese for trace-element deficiencies, and wettable sulfur for control of the citrus rust mite (Phyllocoptruta oleivora (Ashm.)) The trees were given thorough coverage. Again in May or July and in the fall the treatments were used in combination with wettable sulfur, but without copper, zinc, and manganese. A dusting with sulfur on August 20 was necessary in 1953 to prevent russeting by the citrus rust mite.

Results

The treatments, spray dates, and results of these experiments are given in table 1.

In 1953 excellent control of purple scales was obtained through the entire year from the wettable malathion at 2 1/2 pounds, emulsifiable malathion at 1 quart or 1 pint, and parathion plus ovex. Wettable malathion at 1 1/4 pounds and demeton at 1 pint allowed considerable increases by December. Very good control of citrus red mites was obtained with the parathion plus ovex and demeton sprays. The four malathion treatments were equal in control and were commercially satisfactory. Whitefly populations remained at a low level throughout the year in all plots.

In 1954 infestations of purple scales in the trees sprayed with parathion plus ovex, wettable malathion at 2 1/2 pounds, and emulsifiable malathion at 1 quart were held below one living scale per leaf for the entire year, and results with emulsifiable malathion at 1 pint were almost as good, especially in the middle of the year. Demeton at 1 quart reduced a heavy infestation of 20 scales per leaf to less than 4. Control of citrus red mites and whiteflies was satisfactory from all treatments. In the midsummer sampling (July 23) there were no significant differences. In May slightly larger infestations of citrus red mites were seen after the spray of wettable malathion at 1 1/4 pounds and emulsifiable malathion at 1 pint, but even in these plots the control would have been considered good by growers. In October the four malathion treatments were better in controlling the mites than parathion plus ovex or than demeton, which were equal.

In 1955 the same materials were applied to the same trees except that wettable malathion of 1 1/4 pounds was dropped out. A single oil-emulsion spray of 1.25 per cent oil content was used in midsummer on the trees that had been given this malathion treatment in 1953 and 1954, and the concentration in the other malathion treatment was reduced from 2 1/4 to 2 pounds per 100 gallons.

The malathion emulsifiable concentrate at 1 quart and parathion plus ovex at 1 pound per 100 gallons gave the best control of purple scales in 1955, with infestations less than one scale per leaf. Malathion emulsifiable concentrate at 1 pint, malathion wettable powder at 2 pounds, and demeton at 1 quart of 21.2 per cent emulsifiable concentrate also gave acceptable commercial control of this scale. The single oil emulsion spray in July was insufficient for year-round control. This supports conclusions from previous experiments that single scalicide applications cannot be depended upon for year-round control of purple scales on grapefruit trees that have been sprayed with fungicides and minor elements. Control of citrus red mites was satisfactory with all treatments. Superior control was demonstrated by the demeton. Control of whiteflies was not satisfactory, probably because the sprays were timed for control of purple scales. However, after midsummer whiteflies were fewer after demeton than where other materials

(1) Assisting in these experiments were Raymond E. Nute, Charles E. Smith, Eugenia C. Parker, and James L. Sligh. The grower-cooperator was Norman G. Platts of Fort Pierce, Fla.

were used. Considerable control of whiteflies was obtained in all trees by the whitefly fungi Aschersonia spp.

The costs of the scalicides and miticides used in 1955 were calculated from retail prices prevailing at the end of the year. Of these phosphorus materials, 2 pounds of wettable malathion and 1 pint of emulsifiable malathion per 100 gallons were less expensive than the parathion-ovex combination. Emulsifiable malathion did not give distinctly better control at 1 quart than it did at 1 pint, and the 1 quart concentration was more costly than the parathion plus ovex. Demeton at present is too expensive to use as a scalicide, but deserves further study at reduced concentrations for control of the red mites.

Residues(2)

Residues analyses on grapefruit treated with 2 1/2 pounds of 25 per cent malathion wettable powder or 1 quart of 50 per cent emulsifiable malathion, showed no malathion in either juice or rind. Demeton ran 1.02 p. p. m. in the juice and 0.49 p. p. m. in the rind of fruit taken from trees sprayed with 1 quart of the 21.2 per cent emulsifiable concentrate, indicating that demeton locates principally in the juice. Whole fruit analyses for demeton at the same time taken 21 days after the last spraying ran 0.5 p. p. m., and fruits from the same trees taken 28 days after spraying, 0.2 p. p. m. Evidently demeton residues dissipate rapidly after 3 weeks.

Residues in or on fruit samples collected on December 6, 1955, 75 days after the third spraying, were 0.07 p. p. m. of parathion for whole fruits and 0.44 p. p. m. for peel only. There were no detectable residues from ovex, malathion, or demeton. Sixteen grapefruit samples picked 20 days after the last spraying of demeton ranged from 0 to 0.3 p. p. m. This is well under the 0.75 p. p. m. set as tolerance for oranges, and suggests that spray concentrations up to 1 quart per 100 gallons would meet the tolerance after a waiting period of 20 days, if the grapefruit tolerance is fixed at 0.75 p. p. m.

With all six treatments there is no suggestions in the residues analyses that the fruits might exceed safe tolerances.

Summary

Control of purple scales (Lepidosaphes heckii (Newm.)), citrus red mites (Metatetranychus citri (McG.)),

(Continued on page 23)

(2) Analyses of parathion, ovex, and malathion residues were made by R. H. Carter of the Entomology Research Branch. Demeton residues were reported by J. W. Young and M. L. O'Connor of Chemagro Corporation.

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Brumus Suturalis . . . . A Beneficial Lady Beetle

ALLEN G. SELHIME(1)

Brumuus suturalis (F.) is a beneficial insect collected in Pakistan(2). This lady beetle occurs all over India, Ceylon, and the Philippines, and at Lindi, Tanganyika Territory, East Africa (Kapur, 1942). It feeds on mites, psyllids, whitefly eggs and nymphs, aphids, some scale insects, mealybugs, and leafhopper eggs (Kapur, 1942; Rahmon, 1940). It is also reported to feed on the pollen of some grasses (Kapur, 1942).

The beetles were sent from Pakistan to the parasite introduction receiving station at Moorestown, N. J., for identification and quarantine purposes. The first shipments of Brumus from Moorestown reached the Fruit Insects Laboratory in Orlando, Florida, on September 21 and 29, 1954. The first one consisted of six beetles, which were released immediately on the laboratory grounds. The adults crawled from the shipping container as soon as it was opened, flew to the grapefruit tree under which they were released and began to search for food. The second shipment consisted of 37 adults, which were put in rearing jars.

The adult beetle is a small, oval insect about 1/8 inch long. The head and thorax are brown, the eyes black, and the wing covers ivory with two black stripes, one extending down the trailing edge and the other through the middle of each cover (Fig. 1). No other lady beetles in Florida have similar markings. The adults run rapidly over the plants and fly readily. When disturbed, as in handling in the laboratory, the beetles draw up their legs and remain quiet momentarily.

Under laboratory conditions the life cycle has required as few as 19 and as many as 31 days. Low temperatures and meager food supply increase the time required for them to complete their development.

Eggs are laid in clusters of 2 to 20, averaging 12 per cluster (Fig. 2). They are laid shingle-like, in crevices formed by overlapping leaves, in curled leaves, or at the junction of

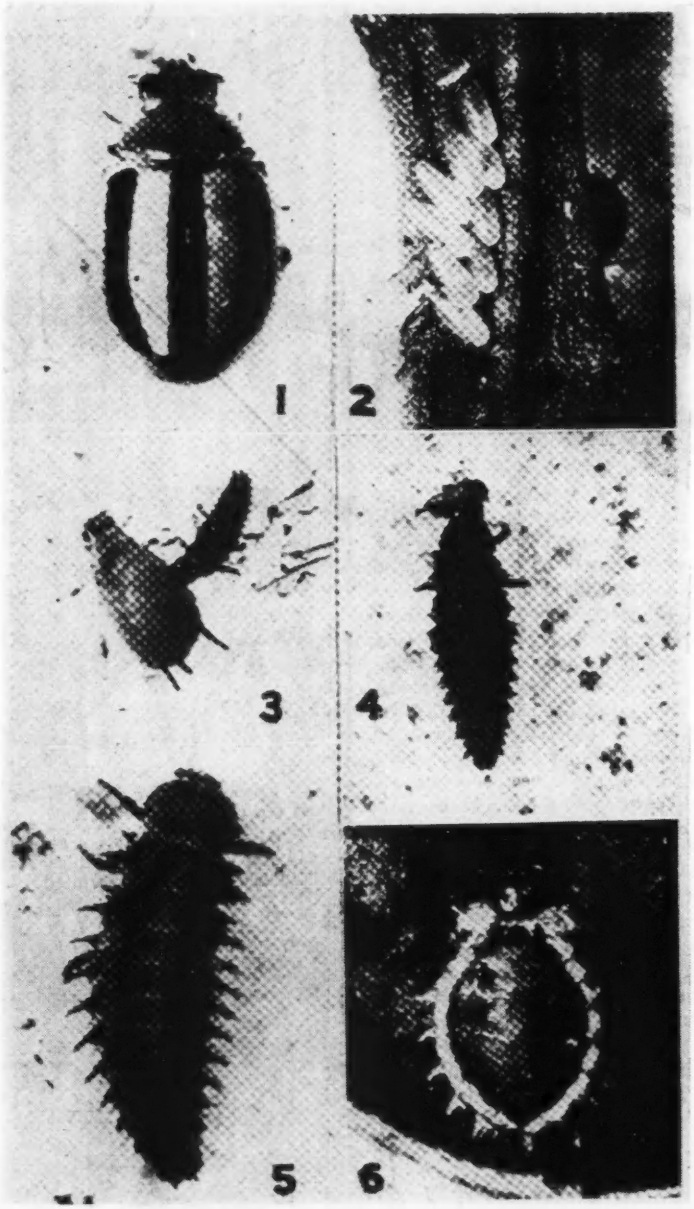


Figure 1. Adult Brumus suturalis F.
Figure 2. Egg cluster.
Figure 3. Day-old larva attacking aphid.
Figure 4. Third stage larva.
Figure 5. Mature larva.
Figure 6. Pupa.

(1) United States Department of Agriculture, Agricultural Research Service, Entomology Research Branch. This work was done under the supervision of Herbert Spencer. Eugenia C. Parker, Wendall N. Spreadbury, Jr., James L. Sligh, and Paul A. Norman assisted in the rearing work.

(2) By George W. Angalet, of the Entomology Research Branch.

leaf and stem. A folded paper towel, with quarter-inch folds stapled together, has proved to be a very satisfactory means of collecting eggs in the laboratory. Eggs were collected once a day. The egg is yellow with a trace of orange shading, and is shaped like a cigar with rounded ends. Under magnification of 20X or more it appears to have numerous shallow depressions in the shell. The egg stage lasts from four to six days. At an average of 85° F. (78°-89.5° range) the eggs started hatching on the fifth day.

The larva goes through four instars (Figs. 3, 4, 5). When newly hatched it is smoky-gray and fuzzy, but with each molt the body becomes more elongated and the spine- or seta-bearing projections are seen more easily, occurring in four rows down the back of the abdominal segments. The average larval period was 12 days at a mean temperature of 85° F., and a day or two longer at 79°.

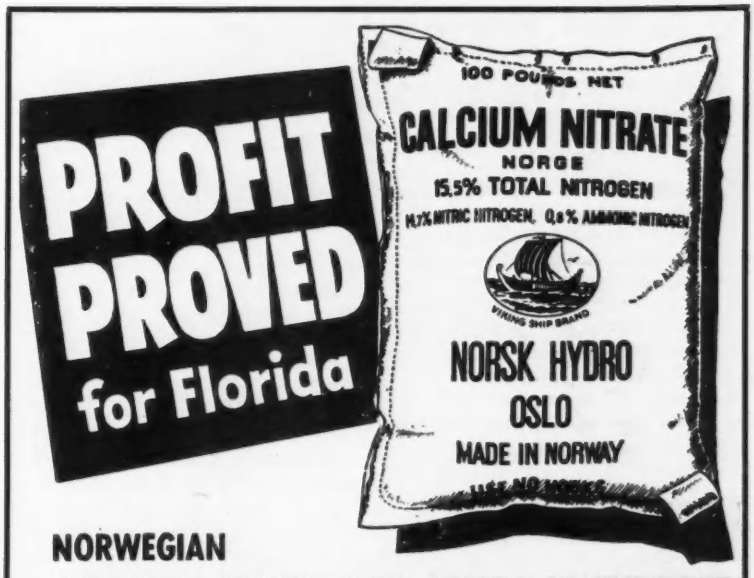
Before pupating the larva attaches itself by its last abdominal segment to a leaf or some other suitable surface. The pupa is encased in the last larval skin (Fig. 6). It is cream-colored, but some individuals may be darker than others. The pupal period lasts from four to six days, with an average of five days.

The adults are a creamy white when they first emerge, but soon assume their markings and coloration. They mate on the third or fourth day after emergence. Eggs are produced by the fifth day.

Brumus suturalis has been reared in the laboratory on mixed colonies of the green citrus aphid (Aphis spiraecola Patch), the melon aphid (A. gassypii Glov., and the black citrus aphid (Toxoptera aurantii Fonsc.). When citrus aphids were difficult to find, the beetles were fed on aphids collected from other plants. Two species of Macrosiphum have been used. M. ambrosiae (Thos.), found feeding on a grass-leaf wild lettuce (Lactuca graminifolia Michx.), was used successfully, and onagrae Patch, found on the weed Gaura angustifolia, 3, to a lesser extent. The cabbage aphid (Brevicoryne brassicae (L) was tried, but most of the Brumus larvae and adults would not feed at all on this aphid.

In addition to the aphids, Brumus has eaten the citrus mealybug (Planococcus citri (Risso), the green scale (Coccus viridis (Green), eggs and nymphs of the citrus whitefly (Dialeurodes citri (Ashm.), and the cloudy-winged whitefly (D. citrifolii (Morg.), and eggs of the citrus red mite

(Continued on page 19)



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Is The Florida Grower Washington's Stepchild?

In his weekly letter to members of the Waverly Growers Cooperative W. C. Pedersen, president of the organization, contends that growers should be paid for trees destroyed in the fight against spreading decline. His letter to growers is reproduced here.—Editor.

W. C. PEDERSEN
PRESIDENT, WAVERLY GROWERS COOPERATIVE

More and more growers are asking me what Mutual is doing to get compensation for losses from citrus trees confiscated by the State Plant Board. Mutual is a grower organization, and small growers who are losing a good share of their worldly goods are looking to Mutual for help. The Florida State Plant Board seems to have no thought other than destroying all citrus trees that are infected with Spreading Decline, regardless of the crop on them or the loss to the growers. The Plant Board is taking out several rows of good trees surrounding the bad ones. However, people with flowering plants that are infected with the Spreading Decline and bring in no income are privileged to be exempt from the destruction of these plants, although these plants might spread the disease anew.

Some prominent Floridians say that growers should not be paid for their losses because only livestock has been paid for in the past. It is hard to find justification for a law that works only one way. Why should a farmer be paid for the destruction of a calf worth $40 that has taken only six months to a year to grow, when a citrus grower is not paid for a citrus tree destroyed that has taken 15 to 25 years to grow and is also worth $40? Both State and Federal Governments are spending millions of dollars to pay farmers for animals destroyed, but not one cent has been paid to citrus growers for losses of trees.

From 1947 to September, 1956, the United States has spent a total of $134,679,654 to eradicate hoof and mouth disease in our country. $905,000 of this amount was spent on research in Europe. Indemnities paid by the United States to ranchers have been approximately $25,835,088. Our Government has spent money to help the Mexicans put down the hoof and mouth disease in their country and recently appropriated $5,000,000 to replace the cattle killed by this disease in Mexico. This is the cost of only one disease. Animals destroyed to eradicate other diseases have also been paid for by both State and Federal Governments.

Some may think the experiments that are being carried on in Florida to eradicate Spreading Decline are a local problem, but this is far from the case. All citrus areas in the United States have these nematodes, and all states have one kind or another. Mr. Norris Leap in an article in the **Saturday Evening Post** of October 15, 1955, says, "The nematode has neither brains nor eyes, yet he is costing the American farmer a tenth of all he grows. Once ignored as harmless, this stubborn worm has been unmasked at last as the king of pests."

If the nematode has become such a national pest, why should a few Florida growers be asked to make the sacrifice of their property for experiments that benefit all people? Florida growers have not protested when they have been asked to contribute to the National Treasury to help the needy in other countries or to provide money for the support of the various farm products grown in the United States. Neither have they objected to contributing their taxes to help their fellow growers' property for the benefit of all, when they have contributed so generously to the needs of others.

FLORIDA CITRUS COMMISSION TO HOLD TRADE LUNCHEONS

(Continued from page 8)

national ad schedules."

Arn called the luncheon meetings . . . "an opportunity for the trade to learn at first-hand about the great amount of support being offered by the Florida citrus industry in each of our important market areas."

Dates and locations of the 18 meetings include Atlanta and Minneapolis on October 29th; Cincinnati and Detroit, October 30th; St. Louis and Cleveland, October 31st; Kansas City and Buffalo, November 1st; Chicago and Pittsburgh, November 2nd; Toronto, November 6th; Montreal, November 7th; Quebec City, November 8th.

Baltimore, November 13th; Philadelphia, November 14th; New York City, November 15th; Boston, November 16th; New Orleans, November 27th.

Spanish moss does not take any nourishment from trees, but it shades the inner branches, causing many small twigs to die, and tends to force growth outward, according to the University of Florida Press book, "Your Florida Garden."

SOUTHERN DOLOMITE
PALMETTO, FLORIDA
PHONE: BRADENTON 2-1411

Handling Efficiency Studies ... On Citrus

BY THE UNIVERSITY OF FLORIDA, AGRICULTURAL ECONOMICS DEPARTMENT
ERIC THOR, ECONOMIST, IN CHARGE

1. Handling Fruit Going to Processing Plants

The cost of handling citrus from the tree to processing plants by the various methods being used in the state is studied at intervals by the University's Agricultural Economics Department. Here are the latest cost figures for each of the 5 different methods being used at various places in the state:

Method of Handling Citrus from Tree to Highway Truck	Cost for 200,000 Box Per Year Operation, with Volume of 200 Boxes Per Hr. (cents per box)
1. Hand dumping field box into highway truck	.68
2. Field box to bulk goat truck to portable elevator	.46
3. Bulk goat truck to portable elevator	.34
4. Tractor bulk field trailer to portable elevator	.32
5. Tractor basket to portable elevator	.27

The costs are all calculated at capacity volume per hour. Distance from trees to highway truck affects the volume that can be handled per hour and the cost per box. The above figures are based on a good "average" distance between trees and highway truck.

Publications which have been released at the University on the cost of moving citrus by various methods from the tree onto highway trucks are as follows:

Agricultural Economics Department Mimeo Report No. 54-2 — "Cost of Handling Citrus Fruit from the Tree Onto the Highway Truck," dated July 1953, by Eric Thor and Luke D. Dohner.

Agricultural Experiment Station Bulletin No. 547, dated September 1954 — ""Cost of Moving Citrus from the Tree Onto Highway Trucks as Related to Methods of Handling," by Eric Thor and Luke D. Rohner.

2. Bulk Handling of Citrus to be Packed for Fresh Market.

The Agricultural Economics Department at the University is also studying at intervals several methods of handling citrus from the grove to the fresh fruit packing houses. The latest cost figures for some of the newer methods of handling this citrus in bulk, as compared to the old conventional method of handling in field boxes, is shown in the following table:

Method of Handling Citrus from Grove to the Packing House	Cost for 300,000 box per year operation when volume per week is 10,000 boxes (cts. per box)*
I. When Groves Are Within 6 Miles of Packing House:	
(1) "Standard" Method: In field box to goat truck to hand dump in packing shed	.32
(2) "Windermere" Method: In bulk on tractor with bulk trailer to packing house conveyor belt and bulk degreening room	.25
II. When Majority of Groves Are More Than 6 Miles From Packing House:	
(1) "Standard" Method: In field box to goat truck to highway truck to degreening room in box, to automatic box dump at packing house	.34
(2) "Vero Beach" Method: In field box to goat truck to highway truck to automatic box dump, to bulk degreening room	.33
(3) "Sanford" Method: In bulk on tractor with bulk basket to portable elevator, to highway truck, to packing house conveyor belt and bulk degreening rooms	.28

* These per box figures include only those costs directly associated with the picking, hauling, receiving and dumping of citrus fruit. They do not include the savings made possible by a more even flow of fruit through the packing house when using bulk conveyors for unloading and bulk degreening rooms instead of conventional handling of fruit in boxes in the degreening rooms and hand dumping or automatic dumping of boxes.

Publications which have been issued at the University on the cost of handling citrus by various methods from the tree to fresh fruit packing houses are as follows:

Agricultural Economics Department Mimeo Report No. 55-1 — "Cost Analysis of Bulk Handling Methods for Fresh Citrus," by Eric Thor (dated September 1954).

Florida Agricultural Experiment Station Bulletin No. 564 dated June 1955 — "Bulk Handling of Fresh Citrus Fruit," by Eric Thor and others.

Other publications will be issued in the future giving later cost figures for the various methods of handling citrus discussed in these publications plus newer methods now being devised.

3. Studies on Cost of Shipping Citrus to Market In Bulk.

Since World War II, there has been considerable expansion of bulk shipments of Florida citrus fruit from packing houses to markets. According to reports of the Florida Department of Agriculture, 122,000 boxes of citrus were shipped in bulk to market during the 1947-48 season. By the 1954-55 season this figure had increased to 1,800,000 boxes. Not all of this quantity was to out-of-state markets, but a large part of it was. Many packing houses are now set up

(Continued on next page)

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HANDLING EFFICIENCY STUDIES ON CITRUS

(Continued from preceding page)

to ship fresh citrus in bulk which has already been degreened, washed, waxed, polished, graded, stamped and sized.

To the point of packing, the oranges to be shipped in bulk are handled the same way as fruit to be packed in boxes or bags. But packing houses interested in bulk shipping install a trap door in the bottom of each packing bin handling each different size of fruit. If the fruit is to be packed in boxes. If the fruit is to be packed closed and the fruit accumulates for packers. If the fruit is to be shipped in bulk, the trap door is opened and the fruit falls through the door onto a conveyor belt installed below. This belt carries it to trucks at the loading dock outside.

Most terminal market receivers of bulk citrus have bagging operations for citrus and other items such as apples, potatoes, and onions. The same bagging machines may handle two or more commodities.

Table 1 included herewith shows that handling costs for citrus fruit packed in 8 pound mesh bags at shipping point packing houses was 16.5 cents per 1 3/5 bushel equivalent as compared with only 11.9 cents for the same equivalent amount packed in the 8 pound mesh bags at terminal market operations. The table gives the various cost items included.

Table 2 indicates that handling costs for citrus fruit packed and shipped in 1 3/5 bushel wirebound boxes from shipping point packing houses through terminal market warehouses to retail stores cost 39.3c per 1 3/5 bushel equivalent. This compares with a handling point packing cost of only 8.5c for the same equivalent amount shipped in bulk from shipping point packing houses, and then loose in reuseable boxes from terminal market warehouses to retail stores which were selling the oranges in bulk bins. If this 30.8c per box saving could go in growers pockets for all fruit sold out of bulk bins in retail stores, it would probably amount to an extra 5 million dollars per year for Florida grove owners. A detailed breakdown of the costs incurred in both methods is shown in Table 2. No report has been published as yet on these bulk handling studies, but one is in preparathion and will be available early in 1957.

TABLE 1
Relative Costs In Handling 100,000 1 3/5 Bushel Equivalents of Oranges Packed In Eight Pound Bags According to Method of Packing

Item of Cost	Method of Packing	
	Shipping Point cents	Market cents
Shipping Point Costs:		
Packing Labor	11.3	0.0
Truck and Load	3.0	0.5
Market Costs:		
Unloading and Handling	2.2	4.0
Packing	0.0	7.4
TOTAL	16.5	11.9

TABLE 2
Relative Costs In Handling 100,000 1 3/5 Bushel Equivalents of Oranges Packed In Wirebound Boxes As Compared With Bulk Shipping And Handling In Loose Boxes

Item of Cost	Method of Handling	
	Packed Boxes cents	Bulk Shipping Loose Boxes cents
Shipping Point Costs:		
Box	25.0*	0.0
Packing Labor	6.0	0.0
Truck and Load	4.0	0.5
Assemble and Label	3.3	0.0
Market Costs:		
Unloading and Handling	1.00	2.0
Loose Boxes	0.0	6.0
TOTAL	39.3	8.5

*Includes an estimated resale value of approximately 15 cents per box at the receiving point

THORNTON APPOINTED ASSISTANT DEAN OF COLLEGE OF AGRICULTURE

Dr. George D. Thornton, professor of soils is new assistant dean of the University of Florida College of Agriculture. His promotion was approved by the State Board of Control, on recommendation of Dean Martin A. Brooker, Provost Willard M. Fifield, and President J. Wayne Reitz.

He succeeds Dean Brooker in his new post and is expected to devote particular attention to the development of a strong graduate program. He is relinquishing his research duties with the Agricultural Experiment Station, but will continue to do some teaching.

EMJEO

(80/82% MAGNESIUM SULPHATE)

Many years a favorite source of soluble magnesia for Florida soils. Used extensively in fertilizer mixtures for citrus crops and vegetables. Especially useful and economical for direct applications where only magnesia is required.

Florida growers now consider magnesium a primary plant food in the same category with nitrogen, phosphorous and potash.

The recommendations of the Florida Citrus Experiment Station at Lake Alfred, published in January 1954, stress the need for large application of magnesium for Citrus in soluble form and state that it is usually applied as a Sulphate.

Ask you fertilizer manufacturer for EMJEO, long a dependable source of this key plant food.

BERKSHIRE CHEMICALS, INC.

420 Lexington Avenue **New York 17, N. Y.**

. Magnesium .
. For a Full Harvest .

BRUMUS SUTURALIS, A BENEFICIAL LADY BEETLE

(Continued from page 15)

(Metatetranychus citri (McG.). The Brumus exhibit cannibalism under crowded conditions or if the natural food supply is limited. They will also attack larvae of other lady beetles and syrphid flies if no other food is available.

Nineteen releases of this predator have been made in Florida, and four shipments have been sent to other places. The groves for the releases were selected with the help of county agents(4). Groves on a no-spray program were chosen to give the beetles the best possible chance of becoming established. Temple oranges and tangerines were selected when possible, as they put out flushes of new growth more readily and furnish a better supply of aphids than other varieties. Of the Florida releases ten, totaling 1,213 reared adults and larvae, were made in Orange County; six, totaling 702 adults, in Lake County; and one each in Marion (97 adults), Indian River (134 adults), and St. Lucie (175 adults) Counties.

One release was made at the Orlando laboratory on July 15. Two hundred forty-nine larvae in various stages were placed on and around a hibiscus bush heavily infested with the melon aphid. Some completed their development, as adults were seen on the bush from July 25 through August 4.

Shipments outside of Florida included 40 larvae sent to the Moorestown laboratory for testing purposes; 36 adults to Riverside, California, and 65 adults to Brownsville, Texas, for rearing; and 78 to Mexico City for liberation.

In the ten months that we have had Brumus, nine complete generations have been reared and the tenth is now in progress. There is much to learn about these beetles, but we believe that they may do considerable good for the citrus and vegetable growers in Florida when they have become established.

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Rahmon, K. A., and Nath, R. 1940. Bionomics and control of the Indian sugarcane leafhopper, Pyrilla perpusilla Wlk. (Rhynchota, Fulg.) in the Punjab. Bul. Ent. Res. 31(2): 179-190.

(3) Identification of these weeds was made by Erdman West, of the University of Florida.

(4) Robert E. Norris of Lake County, Jack McCown of Indian River County, and Henry Swanson of Orange County.

CITRUS HANDLING AND PROCESSING COST STUDIES

(Continued from page 5)

er Cooperative Service, U. S. D. A., Washington, D. C.

The average cost per gallon equivalent of processing and warehousing frozen orange concentrate in Florida incurred by the concentrate plants cooperating in this study during the last seven seasons is as follows:

Cost per gallon: $.465, for season 1948-49; $.451, for 1949-50; $.346, for 1950-51; $.326, for 1951-52; $.372, for 1952-53; $.340, for 1953-54; and $.328, for 1954-55.

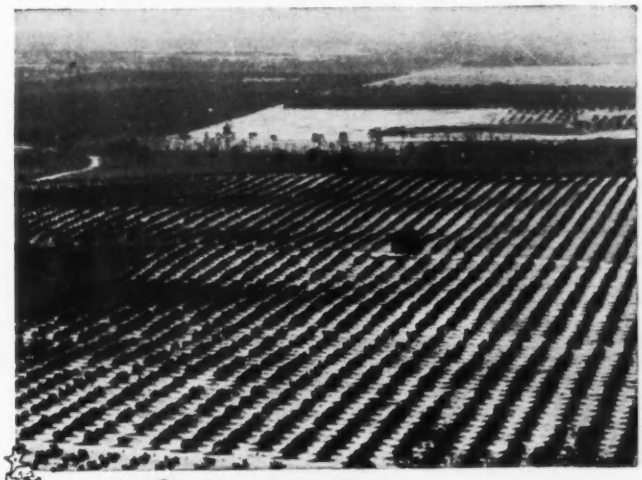
The average cost per case (twelve 46 ounce cans equivalent) of processing, warehousing and selling canned single strength citrus juices by 14 large processing plants cooperating in this study during the 1954-55 season was $1.27 for orange juice, $1.27 for grapefruit juice, and $1.28 for blended juice. Cost of sugar added to some of the juice was excluded. These costs increased 29 cents per

(Continued on page 22)

in its 75th year...GLEN OFFERS MORE!

Three-quarters of a century have proven to growers in Florida and throughout the World that Glen Saint Mary does offer more—both in service and in dependability.

And—at the start of this Diamond Jubilee year—Glen reaffirms its belief in those standards that have made it the largest citrus nurseries in the World.



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Reports Of Our Field Men . . .

SOUTH HILLSBOROUGH AND MANATEE COUNTIES
J. D. Toll

I am happy to report at this time, October 15th, that none of the sections in this territory are suffering from lack of moisture. In fact, some vegetable growers are complaining that their crops have been hurt by too much rainfall.

Groves are in excellent condition — a large number of growers applied the fall application of fertilizer in October. Fruit is sizing up nicely and early fruit is breaking color. Many growers will be banking young trees this month for the cold weather. It is a good practice to apply a small amount of poison such as chlordane in the banks to kill ants, wood lice, and other insects that might damage the trees.

Watermelon growers are busy clearing land and getting the soil in condition for planting the last of December. The soil should be tested and limestone applied if the soil pH is not up to the desired range of 5.8 to 6.2.

This month my territory was expanded to take in West Polk County including Lakeland, Bartow and Fort Meade. Any prospective customers who would like "That Good Lyons Fertilizer" plus excellent field service, please contact me in care of our office. The mailing address is P. O. Box 310, Tampa, Florida. Thank you!

SOUTH POLK, HIGHLANDS, HARDEE, SARASOTA AND DeSOTO COUNTIES
C. R. Wingfield

Autumn storms came quietly into existence and passed up the East Coast. It brought heavy rains and high winds that has caused some damage to vegetable crops and property. Some farming areas were already wet and more rain was not needed. It appears that the western part of my territory did not receive the rains as much as the eastern section.

The rain was very helpful to citrus and will aid in bringing a better size to fruit. The trees are looking good with a good color and in some cases it looks like another flush of growth is appearing. Speaking of growth, there is appearing some damage to leaf and twig on the north side of the tree which looks like Red Spider damage. I find these leaves heavily infested with Rust Mite but no Red Spider. Another case, perhaps, of wind damage on weakened leaf and twig caused by Mite. It should be watched for a few days. This growth, no doubt, is a delayed fall growth. Conditions are good for the fall fertilizer application, which some larger operators have begun.

Grapefruit movement continues and we are looking forward to shipping oranges.

NORTH CENTRAL FLORIDA
V. E. Bourland

We are having some very nice rains, but heavy rains are still somewhat spotted. There has been very little change in most of the lakes. Groves are showing improvement since the rains, most all have made good fall growth, and some bloom. Quite a bit of fruit being moved at present, and all fruit still running small which I think will be beneficial in holding the market price to a satisfactory level. Buyers have been paying from $1.25 to $2.25 per box on tree. Cover crops have been cut and some groves plowed. Rust mite, red spider or purple mite, and different varieties of scale have been very active, and have kept growers busy checking and combatting these pests.

Growers have been spreading dolomite or agriculture lime on most groves, some are putting on fall application of fertilizer and others will be starting soon. Now is the time to cut fire lines around groves.

HIGHLANDS AND POLK COUNTIES
J. K. Enzor, Jr., & R. E. Lassiter, Jr.

The last six weeks have probably been as bad rust mite wise as any period in the last couple of years. Growers should be paying particular attention to this situation at this time.

Due to the recent rains it is hoped that this fall will not produce near the purple mite problems that we had last year and the year before. However, it is that time of the year, and growers should be watching for this insect.

At the time of this writing, October 15th, many people have started their fall fertilizer application.

Most everyone, it seems, is in agreement with the USDA crop estimate. It looks as though we are going to have a very heavy crop of early oranges.

WEST HILLSBOROUGH AND PINELLAS COUNTIES
J. A. Hoffman

As a whole groves are looking good throughout this section. Early oranges are coloring and sizing good. Very little fruit has been shipped out of this section so far.

Rainfall has been a little more plentiful the past few weeks, and growers have been taking advantage of moisture by fertilizing a little early and cutting it in.

A check should be kept for Red Spider and Rust Mite. Red Spiders are showing up in many groves in small populations, but a close watch should be kept, as they increase very rapidly. They should be controlled before leaf drop starts.

EAST HILLSBOROUGH AND PASCO COUNTIES
E. A. McCartney

We finally got some rain over most of this section, which was badly needed. Came just in time for the Fall application of fertilizer. Some red grapefruit has already been moved and early oranges are about ready to ship. There is a lighter crop of grapefruit in some groves this year than was produced last, attributable, no doubt, to the protracted dry weather in early and mid-summer. Although the Valencia crop may pick out a little light, the overall picture looks all right for a good average grove production.

Most growers have some small fruit due to the late bloom and are fertilizing early in order to size it up; groves appear to be in good shape although some scale and red spider are still to be seen along with the ever present rust mite.

Vegetable growers are very grateful for the rains of the past several weeks, they have been just right of the slow, steady, soaking kind that wets the country side instead of washing it away.

ADVERTISEMENT — LYONS FERTILIZER COMPANY

Uncle Bill Says:

Politicians is lambastin' each other sumthin scandalous . . . 'course they don't believe half what they say about each other and in a day or two after election will be out congratulatin, the fellers which beat 'em . . . in the Middle East the whole durned outfit seems to have gone ravin' crazy, shootin' and killin' each other like jist plain idiots . . . Russia's sattelite countries seems to be gittin' tired takin' orders from Moscow, 'n fer that matter it seems they is a lot of folks inside Russia which isn't too happy with the whole situation.

So when we hear some feller in Florida complainin' we feel like kickin' him in the seat of the pants . . . these here statictical fellers show figgers now that tells the whole world Florida is producin' more citrus and citrus products than any other section of the whole world . . . money, industry and folks is flockin' to Florida in wholesale lots . . . and the population figgers of the state has to be revised nearly every month so that we can keep track of how many folks they is livin' in our state.

Us citrus growers, as we've often said, have had our troubles from time to time . . . in fact, we got a couple right now, but fer quite a spell now us citrus growers has been gitten' along mighty good . . . and they is every reason to believe that we'll have a powerful good season this year.

We learn more 'n more about the job of raisin' big crops of fine fruit with each passin' year . . . 'n the public is learnin' to recognize good flavor better each year, so all of us is a heap better satisfied with the results than we was a few years ago.

Those of us who has been growin' fine citrus fruit over the years knows that one of the best ways to Produce Maximum Crops of Finest Quality is to use Lyons Fertilizers . . .and if you ain't tried this method of gettin' the Most and the Best we recommend that you try it out right away.

Color & Processing Charteristics Of Texas Ruby Red G'fruit Investigated

Another in a series of reports of studies on color and processing characteristics of Texas Ruby Red grapefruit has been published recently by B. J. Lime, T. S. Stephens, and F. P. Griffiths, of the U. S. Fruit and Vegetable Products Laboratory, a field station of the Southern Utilization Branch of the Agricultural Research Service, USDA. This article presents a comparison of seasonal variations of color, Brix, and acid in fruit from trees grown in different types of soil. A method for measuring the two principal color constituents of grapefruit, lycopene and carotene, in the same solution is also described in detail.

Studies on color in grapefruit were undertaken at the Fruit and Vegetable Products Laboratory because the greater part of new plantings of grapefruit in the citrus producing area of south Texas are of the colored varieties. At the same time work was started there was comparatively little data in the literature on color in grapefruit.

Processed Juices From Texas Red and Pink Grapefruit — A Progress Report published by A. H. Huffman, Lime, and W. C. Scott in the 1953 proceedings of the Rio Grande Valley Horticultural Institute, presented preliminary findings on a method for preparing naturally colored juice and frozen concentrate from pink and red grapefruit by suspension of finely divided pulp in the juice.

This was followed by **Processing Characteristics of Colored Texas Grapefruit. I. Color and Maturity of Ruby Red Grapefruit,** by Lime, Stephens, and Griffiths, in Food Technology for December 1954. Development of color in relation to Brix, acid, and naringin was treated from July 1953, in the green, immature fruit, to early April 1954, when color was faded, and the fruit well past its peak of quality.

The latest publication, **Processing Characteristics of Colored Texas Grapefruit. II. Correlation of Color Measurements and Pigment Analyses of Ruby Red Grapefruit,** appeared in the 1956 Journal of the Rio Grande Valley Horticultural Society. Reprints of this and the two previous publications may be obtained without cost from the Southern Utilization Branch, 100 Robt. E. Lee Blvd., New Orleans, 19, La., or the U. S. Fruit and Vegetable Products Laboratory, Weslaco, Texas.

CITRUS HANDLING AND PROCESSING COST STUDIES

(Continued from page 19)

case between 1946-47 and 1952-53, and have decreased 8 cents per case since 1952-53.

The average cost of processing, warehousing and selling canned citrus sections per case of 24 No. 303 cans was $2.23 for the 1954-55 season, 10 cents per case below the previous season.

Anyone interested in having their name placed on the mailing list to receive one or more of these three reports each year may write to Mr. Spurlock, Agricultural Economics Department, University of Florida, Gainesville.

In the report for each year, costs are broken down into detailed categories, in order that firms using the report may compare their records with the average of all firms and discover specific items on which they should reduce costs.

From 1946 to 1955 the price of bread rose 70 per cent, the price of wheat 20 per cent.

Spuds Johnson says you can't expect to be a lucky dog if you spend your time howling.

Classified Ads

SUPERIOR CITRUS TREES — We are now booking orders for Summer and Fall 1957 planting. Some varieties available now. Write for quotations and your free copy of "Care of Young Citrus Trees."
WARD'S NURSERY
Box 846 Avon Park, Florida

FOR SALE — HAIRY INDIGO. Early $36.00 cwt. Common $35.00 cwt. Free Delivery on 500 lbs. or more.
LEWIS & VICKERS SEED CO.
P. O. Box 1117 — Phone 3828
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FOR SALE — Cleo Sour and Sweet Seedlings. State inspected. $35.00 per thousand. Will bud any variety to Sour Root, Lemon Root, or Cleo Root for future orders, on 2-year root. Deposit required. Phone 6136 root. Deposit required. Phone 147, J. R. HALL, 121 West Main Street, LEESBURG, FLORIDA.

CITRUS TREES — Limited quantity of leading varieties. Several Hundred Thousand rough lemon seedlings. Place your order with us. Southern Groves—Thornhill Nurseries, Winter Haven, Florida, P. O. Box 1436, OR George M. Thornhill, Dundee, Florida, P. O. Box 411.

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YOUR WAY
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Millions have taken the baths at Hot Springs—America's only health resort with natural thermal waters under the regulation of the Director of the Nat'l. Park Service, U.S. Dept. of the Interior —and, countless people have testified to the magic qualities of these world-famous baths. You, too, can find relief for jangled nerves, aching muscles, stiff joints, hardening of the arteries, and, yes, even rheumatism and arthritis.

THE Majestic
HOTEL & BATHS
From $3 per day single
$4.50 per day double
And you can budget your meals at $4.50 a day

HOT SPRINGS
NATIONAL PARK, ARKANSAS

SEE YOUR TRAVEL AGENT OR WRITE THE MAJESTIC HOTEL FOR LITERATURE

Citrus Commission Advertising To Stress High Quality Fruit

With predictions of good high quality citrus, the Florida Citrus Commission has announced that its November advertising and merchandising promotions will hit hard at a "Back Again" theme designed to announce the opening of the new fresh fruit season.

More than ever, FCC point of sale materials will use the same theme used in nationwide television, radio, and newspaper advertising. Citrus Commission field representatives across the nation are already at work planning local fresh fruit promotions to tie-in with national ads announcing the beginning of a new season.

New merchandising display materials have been designed for point of sale use to closely associate fresh citrus in the retail stores with the theme for each product in ads in virtually all advertising media.

TV spots will be used throughout November at a high frequency over 11 stations throughout the country, with an additional 56 spots delivered by Dave Garroway in his highly rated early morning "Today" show. Garroway will join "Miss America of 1957" to provide an extra push for Florida grapefruit.

Florida fresh citrus spots will also be aired over more than 155 National Broadcasting Company stations during the top "Monitor" shows each week end.

Large 600 and 760 line newspaper ads will appear for Florida citrus in 160 of the nation's top newspapers across the country on November 15, and again on November 29.

CONTROL OF PURPLE SCALES, WHITEFLIES, AND CITRUS RED MITES ON GRAPEFRUIT TREES WITH PHOSPHORUS INSECTICIDES . . .

(Continued from page 13)

and the whiteflies Dioleurodes citri (Ashm.) and citrifolii (Morg.) on Ruby grapefruit trees with three spraying per year of malathion or demeton without added miticide has been compared for 3 years with sprays of parathion plus ovex. The materials were added to post-bloom sprays containing fungicide, minor elements, and sulfur, and to summer and fall sprays of wettable sulfur.

The results suggest that satisfactory commercial control of heavy infestations of purple scales and citrus red mites on grapefruit trees may be obtained by substituting the single material malathion for the parathion plus ovex now generally used. Control of whiteflies would also be satisfactory in most years. At present prices demeton would be too expensive at spray concentrations necessary for control of the scale insects.

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(3) ..... and Allen G. Selhime. 1954. New miticides for the citrus red mite (purple mite). Proc. Fla. State Hort. Soc. 67: 42-44.

Spuds Johnson says people are honored for what they give, rather than what they receive.

Here's why FFF Brand Fertilizer gives Growers

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